Approved For Release 1999/09/16 : CIA-RDP63-00314R000200270052-6

31 JAN 1957

MEMORANDUM FOR: Deputy Director/Intelligence

THROUGH: Assistant Director, Research and Reports Noted By AD/RR

SUBJECT: Foreign Travel - TDY - Munich, Germany; Zurich, Switzerland; Paris, France - 1 September 1956 - 20 December 1956

I. Purpose.

The purpose of the TDY was to 1) attend the International Course for Map Printing and Reproduction which was held in Munich, Germany the week of 3-8 September 1956; 2) survey advanced cartographic techniques, especially in terrain shading, with Prof. Dr. Eduard Imhof, Professor at the Kartographisches Institut, Eidg. Technische Hochschule, Zurich, Switzerland, from 10 September 1956 to 7 December 1956; 3) make a survey of the major official and commercial mapping installations in Germany, Switzerland, and France; 4) visit the Photokina Exhibition at Cologne, Germany, 29-30 September, 1956.

II. Activities and Findings.

A. International Course for Map Printing and Reproduction. The course, organized by Prof. Dr. J. Albrecht, was attended by 160 participants from 13 countries. Sessions were held at the Technische Hochschule.

The primary objectives of the course were to 1) present the European developments in the field of map reproduction; 2) present and discuss problems facing the cartographer in attempting to obtain ideal results in the final offset reproduction of drafted or engraved drawings; 3) attempt to set up international standards for map production. Included in the week's events were visits to the Michael Huber Printing Ink plant, Bayerische Landesvermessungsamt (Land Survey), Printing Press Department of the M.A.N. Manufacturing Company, and the Munich-Dachau Paper Company.

Map reproduction problems facing the European cartographer are virtually the same as those confronting the American cartographer, that is, controlling colors, quality of halftones, etc. One major difference, however, is that the reproduction techniques and procedures are considered an intimate part of European cartography, whereas, in the United States, reproduction is almost entirely divorced from the responsibilities of the cartographer.

In Europe the cartographer is obliged to be thoroughly familiar with reproduction techniques and procedures in order to demand and expect

Approved For Release 1999/09/16 : CIA-RDP63-00314R000200270052-6

Approved For Release 1999/09/16 : CIA-RDP63-00314R000200270052-6

top quality results from reproduction. The decisive impulses that govern the actions of the map reproduction departments must come from cartography - a philosophy that would be difficult to have accepted in the U. S.

Developments in cartography in recent years such as plastic and glass engraving, new methods of representing the relief of the earth's surface, and photomechanical methods of type production have resulted in much finer maps but at the same time have made the cartographer's job much more complex. It was generally agreed that the era of personal influence in cartography is rapidly being replaced with more mechanization and automation and that cartographers who still grasp the old theories are immature in their thoughts and ideas.

Several map production standards were recommended as follows:

1. To adopt the 54 cm. (133 line to the inch) halftone screen for all halftone photography with settings at 0°, 15°, 45°, and 60° for four color reproduction.

2. To establish an international set of printing ink colors.

3. To establish a minimum standard of quality for paper used in map printing.

4. To prepare an International Manual and Glossary of Cartographic Terms.

5. At the final session of the course it was also unanimously agreed upon to hold a continuation of the Map Printing and Reproduction Course in 1958 and to establish an International Congress on Cartography.

Throughout the sessions it was evident that although participants agreed readily to recommendations and suggestions, no official acceptance could be made until home offices could be consulted.

It was unfortunate that map reproduction experts from the major mapping agencies of the U.S. did not attend the course. It is felt that their attendance would have aided greatly in presenting the American point of view of the relationship between cartography and reproduction and in explaining latest technical developments. It is strongly recommended that a representative from the Agency reproduction plant and the Cartography Division attend the next meeting.

This officer was deeply impressed by the serious attitude that prevailed throughout the course, and also, by the thorough knowledge of subject data that every speaker displayed.

Approved For Release 1999/09/16 : CIA-RDP63-00314R000200270052-6

Approved For Release 1999/09/16 : CIA-RDP63-00314R000200270052-6

B. Survey of Advanced Cartographic Techniques. Contact was made with Prof. Dr. Edouard Imhof on arrival in Zurich and arrangements were set to meet at the Eidg. Technische Hochschule to plan a schedule of training. [redacted] Prof. Imhof proved to be very cooperative and anxious to give as much training and instructions as time would allow. Instructions actually began the afternoon of the first meeting. 25X9A5

Prof. Imhof is perhaps the leading cartographer in Europe. He was constantly referred to by the speakers at the Munich meetings and obviously has been a great influence in the rapid advancement of Swiss Cartography, especially in the field of terrain representation. Aside from being a great cartographer, Prof. Imhof is also an author, lecturer, teacher, and artist. At the present time, he has three books on Cartography in progress while concurrently revising the official Swiss school atlas and preparing several Cantonal school wall maps. He employs a full time staff of five assistants, of which two assist in administrative duties at the Cartographic Institute and three work on private cartographic projects at his home studio in Erlenbach, near Zurich.

Instructions received were in the form of informal lectures and practical problems. Lectures were given almost wholly in English, but were supplemented in French where difficulties were encountered. Accompanying each lecture was a remarkable collection of illustrations and graphic aids demonstrating in detail every idea that was introduced.

The technical and sample library-map collection, from which these aids were taken, was also made available for observation and study and resulted in introducing several ideas on a similar file that will be set up in the Cartography Division, a need that has been lacking for several years.

To facilitate instructions and to avoid upsetting Prof. Imhof's schedule, many sessions were held at Erlenbach. This setup, indeed, made the situation more intimate and informal, resulting in a warmer and more friendly atmosphere throughout the Zurich tour.

Several subjects were covered in detail. They are as follows:

1. Theory and practice of terrain representation for large scale maps. Included were thorough discussions on Prof. Imhof's theories of "Air Perspective" and "Color Psychology" as they pertain to the field of terrain shading. Many practical problems were accomplished illustrating both theories.

Knowledge of the "Air Perspective" and "Color Psychology" theories will be of great benefit to the Cartography Division in developing a more realistic terrain map for intelligence use.

Approved For Release 1999/09/16 : CIA-RDP63-00314R000200270052-6

Approved For Release 1999/09/16 : CIA-RDP63-00314R000200270052-6

SUBJECT: Visit to Swiss Federal Topographic Service

2. Theory and practice of terrain representation for small scale maps. Prof. Imhof introduced an entirely new method for producing terrain maps by means of his "Ridge and Valley" technique. By utilizing only ridge and valley lines as a base and in conjunction with larger scale source maps, a very quick and accurate terrain representation can be obtained. This differs from the technique presently being employed in the Division, where a complete contour pattern must be transferred to the base before shading can be started - which is both time consuming and confusing. Several practical problems were completed to demonstrate the new process.

This technique, along with its own color principles, will be especially useful in the Division in preparing small scale terrain maps such as those used for high level intelligence reports and briefings.

3. Considerable time was spent, primarily by means of lectures, on the problems of generalization from large scale to small scale maps, especially as they concern terrain shading. Several useful ideas and rules were obtained which will aid in the training of personnel in the art of terrain shading.

4. Theory, history, and practical applications of hachure maps to represent terrain. Although the use of hachures to represent terrain is outdated, Prof. Imhof felt that knowing its development was important to complete a background in all phases of terrain representation. As hachures are frequently used on pictorial maps and cartograms, it is felt that the techniques learned will have a practical application in the Division.

An interesting point concerning the preparation of hachure maps was brought out. During the late 1800's and early 1900's, hachure maps were very popular and practical because of their ease of reproduction by copper engraving. However, in the steps required to construct a hachure map, a pencil shaded drawing, similar to those employed today, was prepared to be used only as a guide for light and shade in drafting the hachures. Actually, the art of pencil shading was developed along with the improvement of hachures, but this intermediate step did not begin to replace hachures until the introduction of halftones screens and offset photolithography.

5. Techniques and practice in preparing rock drawings. Rock regions are considered a very important part of Swiss maps. Therefore, Prof. Imhof insisted that the Swiss techniques be learned. These techniques will be useful in the Cartography Division terrain work as the same procedures used to prepare rock drawings can be applied to the preparation of similar features, such as sand and lava areas, etc.

6. Several lectures, accompanied by excellent illustrations, were given on those basic geomorphological forms that must be known

Approved For Release 1999/09/16 : CIA-RDP63-00314R000200270052-6

Approved For Release 1999/09/16 : CIA-RDP63-00314R000200270052-6

thoroughly by the cartographer in order to achieve an accurate and realistic terrain drawing. Prof. Imhof has done much work in reducing land forms to a drawable image at map scale and his experiences in this phase of cartography were most interesting to learn.

7. Specialty maps and their problems were discussed. Prof. Imhof has collected a voluminous file on all phases of specialty maps in preparation for writing a book on the subject. It was regrettable that more time could not be spent learning Prof. Imhof's ideas on design and layout of specialty maps. However, he seemed very receptive to the suggestion of training another person exclusively in the field of specialty maps. The Cartography Division would be greatly benefitted if it took advantage of this rare opportunity.

8. Problems and means of preparing oblique terrain drawings were discussed. Methods used by Delkeskamp, famous Swiss cartographer of the early 1800's, were demonstrated. These were strictly graphic and differed greatly from the modern, more accurate method of employing an Elipsograph, a precise machine by means of which it is possible to convert a planimetric image into a foreshortened oblique image. The Elipsographic method would be most useful in preparing detailed oblique terrain studies of small areas at large and medium scales for operational use.

9. Considerable time was spent in surveying teaching and training aids at the Cartographic Institute. The results were very profitable and several ideas in use at Zurich will be adopted by the Cartography Division in training new personnel. One aid in particular, is the use of plaster geometric models to teach the principles of terrain shading. It was found that these models were also most useful in clearing up shading problems that arise while actually preparing a final shaded relief drawing.

Throughout the entire tour in Switzerland there was a constant exchange of technical ideas which were mutually beneficial.

It was found that the briefing time allotted before departure to become thoroughly familiar with new American techniques of cartography, especially in terrain shading, was more than worth the time and effort put into it. The Agency Conversational French Course, taken prior to departure, proved to be of immense value throughout the TDY. It is recommended that all travellers from the Cartography Division be given the same opportunity to prepare as thoroughly.

The following offers of technical assistance have been made to Prof. Imhof and an effort will be made to fulfill them in the near future. They are as follows:

Approved For Release 1999/09/16 : CIA-RDP63-00314R000200270052-6

Approved For Release 1999/09/16 : CIA-RDP63-00314R000200270052-6

SUBJECT: Foreign Trip - Germany, Switzerland, France

1. Procure several white plastic relief models to be used as training aids at the Eidg. Technische Hochschule.

2. Submit Prof. Imhof's name for membership in the American Congress for Surveying and Mapping.

3. Arrange with the Map Library Division for Prof. Imhof to receive copies of Army Map Service Technical Bulletins as they are published.

4. Keep up an exchange of technical developments in cartography which will be handled through the State Department Exchange Program.

C. Survey of Major Official and Commercial Mapping Installations. Approximately eight days during the TDY were spent surveying cartographic installations in Germany, Switzerland, and France. Six governmental organizations and three private companies were contacted. In addition, visits were made to one major publishing company and two instrument companies. In each case, arrangements had been made by Prof. Imhof or Geographic Attaches, Dr. Hodgson and Dr. Pearcy, which resulted in very efficient scheduling. Following is a list of the contacts with specific observations:

1. Orel-Fussli, Zurich. A very comprehensive tour of the plant was conducted by Mr. Stussi, Administrative Chief of Cartography. This private company is one of Switzerland's largest publishing houses and cartography is actually a side line. Maps produced in the Cartographic Department are of the text book, specialty, and tourist variety with no topographic mapping being carried on. Most of the drafting work was being accomplished on Astralon, a fine grained plastic, with Pelikan plastic ink. Beautiful results were observed. A method of drafting on lacquer coated glass was also being employed where absolute registration was required. Stickup was prepared by photographing proofs of printed names and making contact prints on stripping film. The stripping film was then applied to the drafted plate with cement. The American method of producing wax backed celophane stickup was mentioned and great interest on the part of Mr. Stussi and his staff was displayed. Details were then explained and examples were requested from Washington, which, when they arrived, proved most useful as trading material.

Orel-Fussli is responsible for printing and publishing the Swiss School Atlas which Prof. Imhof is now revising. It was arranged with Mr. Stussi to have color separations and progressives of these atlas maps and other terrain maps sent to the Map Library via the State Department Exchange.

Approved For Release 1999/09/16 : CIA-RDP63-00314R000200270052-6

Approved For Release 1999/09/16 : CIA-RDP63-00314R000200270052-6

It was evident that Prof. Imhof influences the direction of cartography at Orel-Fussli. His guidance and recommendations are important factors in the cartographic programs undertaken by the organization.

2. Eidgenossiche Landestopographie, Bern. Contact was made with Prof. Dr. S. Bertschmann, Director, through Prof. Imhof. The official Swiss mapping agency is housed in a large modern structure in the suburbs of Bern. Director Bertschmann, only a few years ago, converted the agency from a slow moving, non-productive outfit to a modern, streamlined organization by revamping the entire group. His major change was to introduce glass negative engraving in favor of copper engraving, which doubled production. The Swiss are now leaders in the engraving field, primarily due to Dr. Bertschmann's dynamic approach and recognition of the advantages available in this technique. A quick tour was made through the Photogrammetry and Compilation Departments, but more time was spent in the Terrain Shading Section and the photographing of these drawings in the Reproduction Department. Mr. Witzler, who developed the terrain techniques now being employed, explained every step in detail. The explanations proved to be of great interest as certain details were being performed in a routine manner which heretofore had been causing trouble in the Cartography Division. A single shading plate is produced here, as is the case in DG/C, but two negatives are made of extreme contrasts so as to produce a more realistic image when printed in two harmonizing colors. Of particular interest was the material on which the shaded drawings were being made. This new material, Pagra/Photo, a sensitized high quality drawing board, laminated on aluminum, appears to be superior to the material which is now being used in the Division. With the help of Mr. Stamp, Chief, Reproduction, examples of Pagra/Photo were obtained and will be tested for possible use by the Division. A collection of maps produced by the Landestopographie was received as a gift from Dr. Bertschmann.

3. Kummerly and Frey, Bern. This visit proved most interesting as the tour was conducted by Mr. Kummerly, whose father was the founder of the commercial organization. A rare opportunity was afforded to see a collection of old original cartographic manuscripts prepared by some of Switzerland's most famous cartographers. Cartography is the most important product at Kummerly and Frey, but quite a bit of publishing work in the form of calendars, brochures, etc., is carried on to supplement map production. As at Orel-Fussli, most of the drafting is done on astralon with plastic ink. Some glass engraving was in progress but primarily as experimentation. Also observed here were several draftsmen being trained in the art of freehand lettering. This is required as a great number of their former maps were lettered by hand and

Approved For Release 1999/09/16 : CIA-RDP63-00314R000200270052-6

Approved For Release 1999/09/16 : CIA-RDP63-00314R000200270052-6

any revisions or corrections must be made in the same manner. Terrain shading work was also observed but in a much more simplified form than Landestopographie or the techniques employed by Prof. Imhof. An interesting point that was checked into thoroughly was the fact that the blueline image is not removed from the shaded relief drawings before photography, a step in the terrain process that has been causing DC/C much trouble in the past. Detailed information on this point was secured.

4. Landeskunde, Remagen. This office, under the direction of Dr. E. Meynen, is responsible for preparing statistical maps and publications for Western Germany. The type of map produced at the Landeskunde is virtually the same as the specialty maps produced by the Cartography Division. The major difference between American and European cartographers was apparent at this installation. The cartographer receives data from the geographer in a rough form, prepares a final worksheet, and specifications, and accomplishes the final drafting. In the Cartography Division, the cartographer is responsible for the map up to the final worksheet stage. At the Landeskunde, all drafting is being performed on Astralon for 1:1 reproduction and a very efficient system of production was noted. After drafting, the map is proofed and at the same time, film positives are made of each plate. Corrections found on the proof are made directly on the film positives which are in turn transferred to the printing plate for deep etch reproduction. The Division's punch and rivet technique of registering plastic separation plates was described and caused quite a sensation. Samples were forwarded to Dr. Meynen and word was received that this time-saving technique was being adopted by the organization. This bit of technical assistance should help in cementing better relations between the Landeskunde and the Geographic Attache in the area.

5. Bayerische Landesvermessungsamt, Munich. The operations of this organization were the same as most governmental agencies producing topographic maps. Of primary interest, however, was the drafting department where the new Hoh and Hahne "Hohlur" photo-lettering machine was in operation. The machine was demonstrated in detail and although excellent results were obtained, it is felt that this is still not the solution to the Division's requirements in photo-lettering. The machine proved to be much too slow in operation and too cumbersome in handling.

6. Karl Wenchow GMBH, Munich. An invitation from Dr. W. Pillewizer to tour the Wenchow plant was gratefully accepted and developed into one of the highlights of the TDY. This organization is known throughout the world for its terrain maps, the bases of which are photographs of actual plaster relief models. Although the techniques employed here are somewhat similar to those used

Approved For Release 1999/09/16 : CIA-RDP63-00314R000200270052-6

Approved For Release 1999/09/16 : CIA-RDP63-00314R000200270052-6

by the Army Map Service in preparing plaster relief models, it was most interesting to observe the operations. Personnel who construct these models are expert sculptors who have received additional training in cartography and geography. Steps in preparation of the final map are complex, from matching sections of model photographs to preparing background hypsometric tones to give a more third-dimensional appearance to the relief. A very intricate system of printing is also involved which occasionally requires fifteen colors to complete a single map.

7. Institut Geographique National, Paris. Like the Landestopographie in Bern, the IGN is a very large topographic mapping agency, staffed like the U. S. Army Map Service. The main body of the organization is located in a suburb of Paris and is housed in a large, modern, well lighted building. As the main interest was map construction and terrain shading, the tour was limited to these two departments. Mr. Dufour, an official in cartography, gave a detailed explanation on the production of the series maps being produced by the Agency, 1:20,000, 1:50,000, and 1:100,000. No engraving is being attempted at the IGN since there is a lack of stability when using plastic, and glass is too fragile and requires large storage areas. However, from the complex drafting procedures observed, it seems as though a great deal of confusion would be avoided if the engraving idea were adopted in one form or another. Terrain shading was being accomplished by means of watercolor and brush over a blueline contour image with aerial photographs and large scale contour maps being used as reference guides. Terrain shading is used only to supplement the reading of contours, thus a complete image is not produced. The emphasis is placed on the main ridges leaving valleys virtually unshaded. This same method is used by the U. S. Army Map Service in their terrain shading section.

8. Michelin, Paris. This establishment is known for its road maps and tourist guides which are considered to be the most accurate and detailed maps and guides of their type produced. Mr. Thibault, Chief of Cartography, conducted an excellent tour which centered around the "Bibette" a photosetter of which the company is very proud. A very detailed system is used to arrive at the final name negative and involves the Hadego photosetter as well as the "Bibette". The principle of operation of the "Bibette" is one of a double synchronized camera setup. As one camera is positioned, by means of hand levers, over a name on a worksheet guide, the other camera is simultaneously positioned over a sheet of film in a light proof chamber. From a pre-exposed negative film strip of the names, made with the Hadego, exposure of the name is made on the film in identical position as on the worksheet. This procedure is repeated until all names have been exposed onto the sheet of film. The developed film results in a film positive of the name plate which is ready for transfer to the printing plate for deep-etch reproduction. The production of new and the revision of

Approved For Release 1999/09/16 : CIA-RDP63-00314R000200270052-6

Approved For Release 1999/09/16 : CIA-RDP63-00314R000200270052-6

SUBJECT: Foreign Travel - Germany, Switzerland, [redacted]

old road maps was observed. A unique system of drafting basic data, such as coastline, rivers, transportation, etc., in colored ink on a single plate is employed. By a simple masking process in reproduction, the composite drawing is separated into three separate negatives for multicolor printing. This technique may have a place in the Division and experiments will be undertaken in the future to ascertain its suitability.

9. Comité National de Geographic, Paris. Contact was made with Dr. Libault, Director of the organization. The CNG is responsible for the production and maintenance of the Atlas de France, which is a collection of statistical maps. Dr. Libault is the inventor of the "Bibette" and a modified model of his machine, the Photocartograph, was seen in production at the Société Optique et Mechanique de Haute Precision. Of great concern to the Division is the fact that Dr. Libault is nearly at the pilot model stage of a new photosetter designed especially to fit the needs of specialty maps production. At the present time, there is no machine available to fill the Division's needs in this important new trend in cartography, and Dr. Libault's invention will be followed with interest. [redacted] has agreed to keep in close contact with Dr. Libault and inform the Division of developments as they occur.

25X1A9a

25X1A9a

At each installation visited, the welcome was warm and courteous and the exchange of technical knowledge seemed to be greatly appreciated by all concerned.

D. Photokina, Cologne, Germany. Two full days were spent touring the Photokina Exhibition, a gigantic display of photographic equipment and materials covering several acres of floor space. A mountain of catalogs, brochures, and samples was collected which will be routed to the Agency reproduction plants and other units concerned for inspection and study. Of specific interest to the Cartography Division, was the Metocut Electronic Trimmer which is capable of easily cutting large sheets of plastic. This machine should be given consideration as a possible addition in the Division's efforts to facilitate and ease working procedures.

III. Problems Concerned with the TDY

No serious problems were encountered during the four-months assignment. Thorough briefing and excellent Central Processing procedures were undoubtedly responsible for such smooth operations

[redacted]

25X1A6a

Approved For Release 1999/09/16 : CIA-RDP63-00314R000200270052-6

Approved For Release 1999/09/16 : CIA-RDP63-00314R000200270052-6

SUBJECT: Report of Temporary Duty

IV. Recommendations and Commitments

A. On speaking and touring with Geographic Attaches Hodgson and Pearcy, it was quite evident that the Division could offer much more in the form of technical cartographic assistance to these men who deal so closely with foreign mapping installations. This assistance should be in the form of samples of new materials accompanied by explanations to use, price, vendor, etc., and articles on new developments in all 25X1A9a phases of cartography. [redacted] welcomed the 25X1A9a [redacted]

B. Prof. Imhof was very receptive to the suggestion that other cartographers from [redacted] study with him on terrain 25X1C4d shading and other phases of cartography. If possible, the Division should take full advantage of this opportunity to receive expert training from one of the world's foremost cartographers.

C. It is strongly recommended that a cartographer from the Cartography Division attend the International Cartography Course to be given at Zurich and Bern, Switzerland, 25 March to 18 May 1957. In discussions with Prof. Imhof, it became apparent that it would be to the Division's advantage to send a participant. Prof. Imhof has agreed to reserve one space for a cartographer from the [redacted] 25X1C4d 25X1C4d [redacted] However, it is imperative that the application be received in Bern by 31 January 1957.

D. It is recommended that an official letter of appreciation be sent Prof. Imhof through the Special Assistant for Maps, Department of State, for his time, effort and cooperation during the tour in Switzerland. The entire time at the Eidg. Technische Hochshule was without payment of funds for instructions or materials received.

E. Several commitments were made to supply mapping installations visited with samples of new cartographic materials and techniques. As most of these items are of a commercial nature, there will be no problem in obtaining them. The material will be dispatched in the near future through the State Department Exchange Program, to be distributed by the Geographic Attaches.

25X1A9a

[redacted]

Assistant Chief, Development and Construction Branch
Cartography Division, ORR

Distribution:
1 - [redacted]
1 - [redacted]
1 - [redacted]
1 - [redacted]
1 - [redacted]
1 - [redacted]

25X1A9a

[redacted] (6 Jan 1957)

Approved For Release 1999/09/16 : CIA-RDP63-00314R000200270052-6